Introduction to MODIS Land Incident PAR Images (North America 2003-2005)

Overview

Incident Photosynthetically Active Radiation (PAR) is the solar radiation from 400 to 700nm reaching the earth surface, which plays a very important role in modeling terrestrial and oceanic productivities. MODIS Land Incident PAR Images (North America 2003-2005) map the daily-integrated PAR over the North American continent at 4 km resolution from year 2003 to 2005 using twin Moderate Resolution Imaging Spectrometer (MODIS) sensors MODIS/Terra and MODIS/Aqua. The daily images are integrated from MODIS/Terra and MODIS/Aqua instantaneous PAR data. The instantaneous PAR data is estimated directly from Terra or Aqua MODIS 5-min L1b swath data.

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Projection

The MODIS PAR products are projected into the MODIS sinusoidal projection. The parameters of the sinusoidal projection we use are:

Radius of reference sphere: 6371007.181m

Longitude of the central meridian: 0.0

False easting: 0.0

False northing: 0.0

Pixel size: 3706.50173222m

The projected files are cut into tile files according to the MODIS tiling system. Each tile has 300*300 pixels.

The following tiles are covering the North American land:

H7V6, H8V4, H8V5, H8V6, H8V7, H9V2, H9V3, H9V4, H9V5, H9V6, H9V7, H9V8, H10V2, H10V3,H10V4,H10V5,H10V6,H10V7,H10V8,H11V2,H11V3,H11V4,H11V5,H11V7,H12V1,H12V2,H12V3,H12V4,H12V5,H13V1,H13V2,H13V3,H13V4,H14V1,H14V2,H14V3,H14V4,H15V0,H15

V1,H15V2,H16V0,H16V1,H16V2,H17V0,H17V1,H17V2

File Format

MODIS Land Incident PAR Images (North America 2003-2005) are stored in the HDF file format, which can be opened by most commercial Remote Sensing software packages (such as: ENVI, ERDAS, PCI). The C language library to operate HDF files can be found at http://hdf.ncsa.uiuc.edu/. In order to save the storage space, all HDF files are internally compressed using GZIP.

Regulation of Naming Files

MODIS Land Incident PAR Images (North America 2003-2005) use the following format to name files:

DailyPAR.A**YYYYDDD**.H**MM**V**NN**.zip.hdf

Where, YYYY is the year and DDD is the day of year; MM is the H number of MODIS tiling system and NN is the V number.

For example, DailyPAR.A2003001.H07V06.hdf means this is the daily-integrated PAR of the first day of 2003, covering tile H07V06.

Bands

Each daily-integrated PAR image has four bands:

DirectPAR, 16 bit signed integer, the direct part of the daily-integrated PAR value

DiffusePAR, 16 bit signed integer, the diffuse part of the daily-integrated PAR value

TotalPAR, 16 bit signed integer, the total daily-integrated PAR value

ObservationCount, 8 bit signed integer, referring to how many instantaneous PAR values are used to estimate the daily-integrated value.

The unit in the first three datasets is $kJ/m^2/day$, and the fill value is 32767

Known problems:

The released version is version 1.5 and last modified on May 15 2008. The integration method is the adjusted sinusoidal model, which may produce slight biases in some cases.

Citation:

The users are required to acknowledge the authors when using this data in any types of publications. The sample citations:

Liang, S. L., Zheng, T., et al. (2006). "Estimation of incident photosynthetically active radiation from Moderate Resolution Imaging Spectrometer data." Journal of Geophysical

Research-Atmospheres 111(D15).

Wang, D., Liang, S., et al. (2007). "Estimation of daily-integrated PAR from sparse satellite observations: comparison of temporal scaling methods." International Journal of Remote Sensing Submitted.